SUMMARY OF
ANALYTICAL DATA REVIEW

El Dorado Hills Naturally Occurring Asbestos
Multimedia Exposure Assessment

El Dorado Hills, California

Project TDD Number: 09-04-01-0011

PAN: 001275-0440.01TA

E & E Reviewer: Howard Edwards

Date: April 11, 2005

Laboratory(s): Lab/Cor, Inc.

Manager: John Harris

Data Validation Reviewer: Trillium, Inc.

Reviewer: Denise A. Shepperd

Analytical Method(s): **ISO 10312 Ambient air—Determination of asbestos fibres—Direct-transfer transmission electron microscopy method**

1. Data Validation Review

Trillium, Inc., reviewed all ISO 10312 analysis data generated by Lab/Cor, Inc., for the El Dorado Hills Naturally Occurring Asbestos Multimedia Exposure Assessment in El Dorado Hills, California. The validation process included the following elements:
- Verification that all analytical documentation was provided,
- Review/evaluation of all analytical documentation based on appropriate guidance,
- Generation of a formal Data Validation Report, and
- Qualification and adjustment of data based on data validation.

The detailed data validation reports are attached.

2. Major Quality Findings of the Data Validation

Major quality findings regarding the ISO 10312 analysis data generated by Lab/Cor, Inc., were not found. There were minor calculation revisions that are documented in detail within the attached data validation reports.

3. E & E Review of Analysis Data for Co-located Samplers

There are analysis data from 14 pairs of low-flow personal air sample pumps and 16 pairs of high-flow air sample pumps. A review evaluated whether the difference between concentration data for co-located paired data was within the 95 percent confidence interval for a Poisson distribution. The review found that there was no significant difference in the detected structure quantities for 12 of the data pairs from the low-flow personal air sample pumps. The review found that there was no significant difference in the detected structure quantities for 14 of the data pairs from the high-flow air sample pumps.

1

001275:0440.01CP – Data Review Summary - Draft - April 8, 2005
El Dorado Hills Naturally Occurring Asbestos Multimedia Exposure Assessment

Ecology and Environment, Inc.

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For two pairs of co-located data from the low-flow personal air sample pumps the difference was found to be outside the 95 percent confidence interval. The results for both data pairs were, however, within the same magnitude as the other data generated for their respective scenarios.

For one of the two data pairs from the high-flow air sample pumps the difference was found to be outside the 95 percent confidence interval. The results for the data pair were, however, within the same magnitude as the other data generated for the scenario.

Finally, for the other data pair from the high-flow air sample pumps where a difference was found, the results for the data pair were different by an order of magnitude. The results from the two high-flow air sample pumps situated on the pitcher's mound during the third scenario at the South Field at the El Dorado Hills Community Park show that one set of data is one order of magnitude below all other data generated during the scenario. The results are similar to that of the upwind sampling location (e.g., within 2 % relative percent difference).

4. E & E Conclusions on Overall Data Usability

These data are considered usable for the following data use objective stated in Quality Assurance Project Plan (QAPP) dated September 2004 for the **El Dorado Hills Naturally Occurring Asbestos Multimedia Exposure Assessment.**

- All sample data collected during the project will assist the USEPA in identifying and estimating associated exposure levels for locations in El Dorado Hills where there is a potential for exposure to asbestos from disturbed areas of naturally occurring asbestos.
- The USEPA will use the activity-based outdoor air data collected during the project to document whether and at what concentrations asbestos fibers are present in outdoor air at specific sampled locations on the days of sampling.
- The USEPA will use the fixed high-flow air sample pumps set up at the Community Park and schools to collect ambient outdoor air samples under normal conditions to serve as reference samples.

The data meet quality objectives stated in the QAPP for the following analytical sensitivity, precision, accuracy and completeness with the following notations:

- The analytical sensitivity for specified asbestos structures was acceptable for all results.
- The precision of laboratory replicates, laboratory duplicates and co-located samples met the quality objective goal with the exception of four out of 30 co-located samples. Of the four co-located samples that did not meet stated quality goals, three are considered

2

001275.0440.01CP – Data Review Summary - Draft - April 8, 2005
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Project TDD Number: 09-04-01-0011   PAN: 001275-0440.01TA

E & E Reviewer: Howard Edwards   Date: April 11, 2005

acceptable since they meet the general criteria for co-located samples from a heterogeneous matrix. One co-located sample out of 30 indicated the potential for a 10-fold precision variance.

- The accuracy for analysis of internal control samples was acceptable. The EPA QA office will evaluate in a separate report the accuracy for the blind and double blind performance evaluation samples submitted to the laboratory.

- Some of the samples were lost (i.e., they were not able to be analyzed) because the sample filter either had a factory defect or there was a rupture due to changes in pressure during sampling. The completeness goal of 100% for activity-based personal samples during the first scenario at South Field at the El Dorado Hills Community Park was not achieved. Data from one of five air sample pumps were lost during sample collection (i.e., 80% completeness was achieved). The completeness goal of 100% for the Children's Playground high-volume air samples collected on October 5, 2004, was not achieved. Data from one of five samplers were lost during sample collection (i.e., 80% completeness was achieved). The completeness goal of 100% for fixed ambient reference high-volume air samples on October 7, 2004 was not achieved. Data from one of five samplers were lost during sample collection (i.e., 80% completeness was achieved). All other completeness goals were achieved.

Attached are the Data Validation Reports with summary tables.

SUMMARY OF
ANALYTICAL DATA REVIEW

El Dorado Hills Naturally Occurring Asbestos
Multimedia Exposure Assessment

El Dorado Hills, California

Project TDD Number: 09-04-01-0011

PAN: 001275-0440.01TA

E & E Reviewer: Howard Edwards

Date: September 26, 2005

Laboratory(s): Lab/Cor, Inc.

Manager: John Harris

Data Validation Reviewer: Trillium, Inc.

Reviewer: Denise A. Shepperd

Analytical Method(s): ISO 13794 Ambient air — Determination of asbestos fibres — Indirect-transfer transmission electron microscopy method

1. Data Validation Review

Trillium, Inc., reviewed all ISO 13794 analysis data generated by Lab/Cor, Inc., for the El Dorado Hills Naturally Occurring Asbestos Multimedia Exposure Assessment in El Dorado Hills, California. The validation process included the following elements:
- Verification that all analytical documentation was provided,
- Review/evaluation of all analytical documentation based on appropriate guidance,
- Generation of a formal Data Validation Report, and
- Qualification and adjustment of data based on data validation.

The detailed data validation reports are attached.

2. Major Quality Findings of the Data Validation

Major quality findings regarding the ISO 13794 analysis data generated by Lab/Cor, Inc., were not found. There were minor calculation revisions that are documented in detail within the attached data validation reports.

3. E & E Review of Analysis Data for Co-located Samplers

Paired Data Sets Both Analyzed by ISO 13794
There are ISO 13794 analysis data from five pairs of low-flow personal air sample pumps and two pairs of high-flow air sample pumps. E & E conducted a review of the data to evaluate whether the difference between concentration data for co-located paired data was within the 95 percent confidence interval for a Poisson distribution. The review found that there was no significant difference in the detected structure quantities for three of the data pairs from the low-flow personal air sample pumps. The review found that there was no significant difference in the detected structure quantities for one of the data pairs from the high-flow air sample pumps.

1

001275.0440.01CP – Data Review Summary – September 26, 2005
El Dorado Hills Naturally Occurring Asbestos Multimedia Exposure Assessment

Ecology and Environment, Inc.

SUMMARY OF
ANALYTICAL DATA REVIEW

El Dorado Hills Naturally Occurring Asbestos   **El Dorado Hills, California**
Multimedia Exposure Assessment

Project TDD Number: 09-04-01-0011   **PAN: 001275-0440.01TA**

E & E Reviewer: Howard Edwards   **Date: September 26, 2005**

For two pairs of co-located data from the low-flow personal air sample pumps the differences were found to be outside the 95 percent confidence interval. The results for both data pairs were, however, within the same concentration range as other data generated during the same scenarios.

For one of the two data pairs from the high-flow air sample pumps the difference was found to be outside the 95 percent confidence interval. The results for both data pairs were, however, within the same concentration range as other data generated during the same scenario.

Co-located Samples Analyzed by ISO 10312 and ISO 13794
There are analysis data from one pair of low-flow personal air sample pumps where the analysis was done by ISO 10312 for one sample (APG-L2-3CH-100404) and by ISO 13794 for the co-located sample (APG-L2-13CH-100404). E & E conducted a review of the data to evaluate whether the difference between concentration data for this co-located data pair was within the 95 percent confidence interval for a Poisson distribution.

The review found that there was significant difference in the detected structure quantities for the data pair. Results for APG-L2-13CH-100404 (analyzed by ISO 13794) were an order of magnitude greater than results for APG-L2-3CH-100404 (analyzed by 10312). The review also found, however, that there was a ten-fold difference in the detected structure quantities for the co-located sample (APG-L2-13CH-100404) when compared to results for all other samples collected during the same scenario, whether analyzed by ISO 10312 or by ISO 13794. In other words, the results for co-located sample APG-L2-13CH-100404 were one order of magnitude higher than results for four other samples from the same scenario analyzed by ISO 10312 and one other sample from the same scenario analyzed by ISO 13794.

4. E & E Conclusions on Overall Data Usability

These data are considered usable for the following data use objective stated in Quality Assurance Project Plan (QAPP) dated September 2004 for the **El Dorado Hills Naturally Occurring Asbestos Multimedia Exposure Assessment.**

- All sample data collected during the project will assist the USEPA in identifying and estimating associated exposure levels for locations in El Dorado Hills where there is a potential for exposure to asbestos from disturbed areas of naturally occurring asbestos.
- The USEPA will use the activity-based outdoor air data collected during the project to document whether and at what concentrations asbestos fibers are present in outdoor air at specific sampled locations on the days of sampling.
- The USEPA will use the fixed high-flow air sample pumps set up at the Community Park and schools to collect ambient outdoor air samples under normal conditions to serve as reference samples.

2

SUMMARY OF
ANALYTICAL DATA REVIEW

El Dorado Hills Naturally Occurring Asbestos   El Dorado Hills, California
Multimedia Exposure Assessment

Project TDD Number: 09-04-01-0011   PAN: 001275-0440.01TA

E & E Reviewer: Howard Edwards   Date: September 26, 2005

The data meet quality objectives stated in the QAPP for the following analytical sensitivity, precision, accuracy and completeness, with the following notations:

- The analytical sensitivity for specified asbestos structures was acceptable for all results.
- The precision of laboratory replicates, laboratory duplicates and co-located samples met the quality objective goal with the exception of three out of seven co-located samples. Of the three co-located samples that did not meet stated quality goals, all are considered acceptable since they meet the general criteria for co-located samples from a heterogeneous matrix.
- For the one co-located sample set analyzed by both ISO 10312 and ISO 13794, the data indicated a 10-fold precision variance. Results for the co-located sample, an order of magnitude higher than those of its partner sample, also had a 10-fold variance with results from another sample collected during the same scenario and both analyzed by ISO 13794. The observed variance is a likely due to the heterogeneous environment purposely generated during activity-based sampling. Additional evaluation was not conducted to assess the precision between samples analyzed by both ISO 10312 and ISO 13794.
- The accuracy for the analysis portion of ISO 13794 (e.g., ISO 10312) was acceptable. The EPA QA office will evaluate accuracy for analysis by ISO 10312 in a separate report based upon the analysis of blind and double blind performance evaluation samples submitted to the laboratory. The accuracy of Lab/Cor, Inc.'s extraction and analysis by ISO 13794 was not evaluated.
- Some of the samples were not able to be analyzed because the sample filter either had a factory defect or there was a rupture due to changes in pressure during sampling. For this reason, the completeness goal of 100% for activity-based personal samples during the first baseball scenario at the South Field (Baseball A) at the El Dorado Hills Community Park was not achieved. Data from one of five air sample pumps were not usable (i.e., 80% completeness was achieved). The completeness goal of 100% for the Children's Playground high-volume air samples collected on October 5, 2004, was not achieved. Data from one of five samplers were not usable (i.e., 80% completeness was achieved). The completeness goal of 100% for fixed ambient reference high-volume air samples on October 7, 2004, was not achieved. Data from one of five samplers was not usable (i.e., 80% completeness was achieved). All other completeness goals were achieved.

Attached are the Data Validation Reports with summary tables.

Data Validation Report

TDD No:	09-04-01-0011
PAN:	001275.0440.01TA
Site:	El Dorado Hills
Laboratory:	Lab/Cor, Inc.
Reviewer:	Denise A. Shepperd, Trillium, Inc.
Date:	May 23, 2005
	Revised August 11, 2005
	Revised September 26, 2005

I.   Case Summary

SAMPLE INFORMATION:

Asbestos Samples: CC2-L6-11CC-100504; CC2-L6-1CC-100504; CC2-L6-2CC-100504; CC2-L6-3CC-100504; CC5-H6-1CP-100604; CC5-H6-2CP-100604; CC5-L6-2CB-100604; NFB-H2-3FD-100504; SFBA-L2-1CH-100504; SFBA-L2-2CH-100504; SFBB-H2-1FD-100604; SFBB-H2-2FD-100604; SFBB-L2-2CH-100604; SFBC-H2-2FD-100604; NFB-L2-15CH-100504; NFB-L2-1CH-100504; NFB-L2-4CH-100504; NFB-L2-5CH-100504; SFBC-L2-1CH-100604; SFBC-L2-3CH-100604; SFBC-L2-4CH-100604; SFBC-L2-5CH-100604; SFBA-H2-2PG-100504; SFBA-H2-4PG-100504; SFBB-H2-2PG-100604; SFBB-H2-4PG-100604; SFBB-H2-5PG-100604; and SFBC-H2-4PG-100604

Matrix:	28 Air samples
Analysis:	Asbestos by Transmission Electron Microscopy
Collection Dates:	October 5 and 6, 2004
Sample Receipt Date:	October 9, 2004
Filter Preparation Date:	January 7 through March 30, 2005
Grid Preparation Date:	January 21 through March 30, 2005
TEM Analysis Dates:	February 6 through April 1, 2005
Analytical Method:	ISO Method 13794

FIELD QC:

Field Trip Blanks (ZB):	NFB-L2-1ZB-10050; SFBB-L2-1ZB-10060; NYB-L2-1ZB-10070; JEG-L2-1ZB-10070; SRA-1ZB-1008004
Filter Blanks (FB):	SFBA-L2-FB-10050; JEG-L2-FB-101004; NRA-FB-101004
Column Balnk (FB):	NRA-FB-101005
Equipment Blanks (EB):	
Method Blank (MB):	4 glass filter blanks
Field Duplicates (D1):	Not Identified

TABLES:

1A:	Analytical Results with Qualifications
1B:	Data Qualifier Definitions for Inorganic Data Review

SAMPLING ISSUES:

No chain of custody documents were provided in the data package. Chain of custody documentation that included these samples was provided on 5/4/05 by electronic transfer, at the request of the validator.

Sample SFBA-H2-4PG-100504 was rejected at preparation because the filter was blown out. This sample was not prepared for analysis.

VALIDATION PARAMETERS AND COMMENTS:

I. Holding Times, Preservation and Sample Integrity

This parameter is evaluated to ensure that sample custody is documented from collection through analysis, samples are analyzed within the recommended holding time, and that no alteration in sample content has occurred during sample shipment, handling, and storage.

There is no established holding time or storage condition for asbestos samples.

A total of six COC records were used to document the collection of these samples. Only the first of these six records was signed and dated as relinquished. Five of the six records were signed and dated on receipt at the laboratory. The sixth record had no signatures, dates, or times for relinquishment or receipt of samples.

II. Calibration

The analyses of materials of known content ensures that identification and quantitation of analytes will be accurate for all samples. Review of the documentation provided for appropriate calibration determines whether or not the analytical results reported by the laboratory are valid and supported by the data.

The data deliverables for this project were included in multiple data packages in several shipments. Instrument calibration documentation was provided in a separate data package in association with the site sample data packages in this shipment and included camera and screen magnification calibration (performed 4/7/05 to 4/13/05), camera length and constant calibration (performed 4/5/05 to 4/14/05), EDS peak resolution check (performed on 4/7/05), and maintenance logs for both instruments used for analyses, covering the months of March and April of 2005.

A form entitled "Microscope Based Quality Control" for the month of April 2005 was included. This form listed the various instrument calibration parameters, required frequencies, dates performed, and results. According to this form, k-factor calibration was performed most recently on the two microscopes on 1/11/05 and 3/14/05; beam dose was calibrated on 2/9/05 and 3/18/05.

No documentation of grid opening size was provided.

Documentation to support the identification and quantitation in the site samples in these data packages was provided separately with a previous shipment of data packages from the same project, and included the following:

A letter representing documentation of an NVLAP laboratory site assessment conducted on 11/7/03 was included in the data package. The letter, dated 5/10/04, indicated that the laboratory met the on-site assessment requirements.

Results and evaluator notes and tables were included for an NISTIR 5351 analysis of an inter-laboratory QC sample. The laboratory's raw data were compiled and assessed by Batta Labs. Analysts were identified by initials and included two of the analysts' initials documented with this sample set. "DW" and "KM" performed these PE sample analyses, "JH" and "TM" were not represented. According to the assessor's notes, the sample included chrysotile fibers and structures and the laboratory's results were within NVLAP and NISTIR 5351 acceptance limits. No raw data were provided for this QC sample in the original data package. Raw data were provided under separate cover, at the request of the validator.

Results for a New York State Department of Health Environmental Laboratory Approval Program proficiency test, conducted between 9/7/04 and 11/9/04, were also included. The proficiency samples included asbestos in air. The laboratory's results were satisfactory for all four of the air sample categories. Actinolite and amosite fiber types were identified and counts were acceptable, according to the data sheet. No raw data were provided for this proficiency sample. Upon request, the laboratory provided raw data documenting the identification of actinolite and amosite asbestos on 1/27/05, in conjunction with the validation of a previous shipment of data packages. These data were inserted by the validator into the QC data package provided, as supporting data, with the previous shipment of data packages.

Documentation for a round-robin sample analyzed in the fall of 2004, by three separate laboratories, as part of the NVLAP requirements, was also included in the QC data package. The documentation included raw count sheets and reported results, as well as comparison with other laboratories' results. Results for all parameters were acceptable. According to the documentation, the only analyst who participated in these analyses was "DW."

Based on the fact that the laboratory demonstrated proficiency in the performance evaluation (PE) analyses performed in the third quarter of 2004, and that these PE samples included the two predominant asbestos types detected in this field sample set, no action was taken by the validator.

III. Blanks

Sample matrices known to be devoid of the analytes of interest (method blanks) are prepared and analyzed with each analytical batch. Evaluation of this parameter ensures that contamination introduced during preparation and analyses is not attributed to the field samples.

Other blanks may be generated in the field or laboratory to ensure that no contamination is introduced during sampling and/or storage.

No field-generated blanks were included with this data set.

The laboratory preparation list and log indicated that one laboratory preparation filter blank was prepared and analyzed by the indirect method in association with the entire 70-sample set (041172, 041188, 041191, 141210, and 050680). No raw data were supplied for this blank, but a value of "0" structures detected was present on the QC summary form. According to the prep sheets, this blank was prepared on 1/13/05 (ashed and "hydrolyzed") and 3/16/05 (grid preparation). This blank would be an indicator of any contamination present in the blank filters used for preparation and for any contamination present in the prep lab environment on 1/13/05 and 3/16/05, but it does not address contamination issues for the dates on which the samples in this data set (041188) were prepared, which ranged from January 7, 1005 until March 30, 2005, and did not include either of the blank prep dates.

The indirect method used (ISO 13794), recommends analyzing a filter blank and a beaker blank with each set of samples prepared. In addition, it is recommended that the laboratory include an unused filter for preparation with every microscope slide containing sample filters that is prepared. None of these blanks were documented with this data set. Without blanks it is not possible to assess the presence or absence of laboratory contamination or its impact on the site sample results.

The laboratory had prepared blanks with the preparation and analyses of samples in this data set. At the client's request the laboratory analyzed a percentage of the prepared blanks. Data for these blanks were received by the validator on July 6, 2005. Four filter blanks, five field trip blanks, four glass filter blanks, and one column blank were prepared and analyzed as laboratory blanks. No asbestos structures were detected in any of the blanks.

IV. Spiked Samples

The analytes of interest are added in known concentrations to like-matrix blanks or authentic field samples before preparation. This parameter is evaluated in order to assess the laboratory's ability to preserve and recover the compounds of interest.

The analytical method does not require laboratory spiked sample analyses. It is recommended by the validator that some type of laboratory prepared or purchased spiked analyses be performed with each analytical sample batch.

The project requirements specified that results from the most recent inter-laboratory study would be acceptable as a laboratory control sample (LCS) for these data. This requirement was met by the laboratory and results, reported with previous data submissions for this project, for the inter-laboratory study sample were acceptable for all air sample parameters (see Section I). The data user should note, however, that no reference material was prepared and analyzed by the indirect method (ISO 13794) employed for the preparation and analyses of the site samples. This method is used when filter loading is too high to allow the use of the direct method (ISO 10312) and depends on recovery of material from the air-sampling filter, resuspension in solution, effecting a dilution, and redistribution on a secondary filter which is then prepared as for the direct TEM analysis method. Because there are additional steps involved in the preparation, there are additional error factors introduced. It is recommended that a reference material be prepared and analyzed by the indirect method so that performance can be tracked by the laboratory for support of field sample analyses by this procedure.

V. Duplicate/Replicate Samples

Results for duplicate/replicate samples are evaluated to assess the laboratory's precision for the analytes of interest in the applicable sample matrix. For asbestos analyses, duplicate and replicate measurements take the form of a combination of variables which include the preparation of the grid, the choice of grid openings to be analyzed, and the analyst performing the counting and identification of structures. For the indirect method the variables should also include preparation of the filter itself.

The laboratory included all of the QC samples prepared from all of the field sample sets in this shipment in a separate data package under a separate report number (050580).

Two analysts, JH and TM, not represented in the PE sample analyses included with the data packages for this project, did perform intra-laboratory replicate and duplicate analyses on associated field samples. Results for these QC analyses for these analysts were within the sample-specific acceptance limits stipulated by the method.

The quality assurance project plan (QAPP) requires five types of laboratory duplicate/replicate analyses, each to be performed at a rate of 5% (one for every twenty) of the field samples. Based on the total of samples prepared by the indirect method and included in all of the data packages in this shipment combined (70 samples), four or more of each of these QC sample pairs were required (a total of 20 QC sample pairs).

The laboratory compared the primary asbestos structure count for each of the QC samples prepared and analyzed. Results for all of the duplicate/replicate pair types were evaluated based on 95% confidence limits determined from the original sample count. Results for all of the reported QC samples were within the laboratory's calculated limits.

One of the samples (NFB-H2-3FD-100504) in this data set (041188) was prepared for and/or analyzed as three different QC pairs. According to the sample preparation list and log, three different indirect preparations were done with this sample. It is not clear from the documentation at which point in the preparation process the duplication was produced. The sample is listed under the original sample identification and also twice under the number assigned for the separate QC sample batch. It appears that the sample collection filter was cut into pieces before ashing and these separate pieces were processed as duplicates.

Results for the three separate preparations fell within the 95% confidence limits generated from the original sample count of 9 structures. The sample was also analyzed as a replicate pair in which the same analyst recounted the same grid openings. According to the count sheets for the original sample and this replicate count, structures were only detected in both the sample and QC replicate in three grid openings. A total of 19 grid openings in the two counts did not agree. In 13 grid openings in the original sample count there were no structures detected but asbestos structures were detected in the second count. In six other grid openings in the original count, structures were detected, but not in these same grid openings in the recount. Nonetheless, the overall count for the two analyses did fall within the 95% confidence limits.

In summary, the laboratory analyzed a total of 11 QC sample pairs from three of the five associated data sets. A summary of the laboratory QC samples analyzed is as follows:

Replicate analyses:

- Two samples were analyzed as replicates, wherein a different preparation was analyzed by the same analyst.

Duplicate analyses:

- Three samples were analyzed as duplicates, wherein the same grid openings were recounted by a different analyst;

- Three samples were analyzed as duplicates, wherein different grid openings were selected for counting by a different analyst; and

- Three samples were analyzed as duplicates, wherein a different analyst counted a different preparation.

No samples were analyzed as replicates, wherein the same analyst re-counts the same sample a second time counting different grid openings.

According to the preparation list and log, two samples (the one from 041188 and one from 041191) were re-prepared on 3/29/05 and 3/30/05. The second preparation of these two samples involved ashing the filters for two hours, according to notes on the prep list. It was assumed by the validator that these were the only samples which were carried through all of the filtering and grid preparation steps. Other QC samples listed as repreps were assumed to be additional grid preparations from the same filter only. The length of filter ashing time for the original sample preparations was not recorded.

Agreement between the results for all of the 11 sample QC pairs analyzed in conjunction with the combined project-related laboratory batches in four of the required categories were acceptable. In addition, four samples were re-analyzed by the same analyst counting the same grid openings. These results were also acceptable according to the laboratory-specified limits. This category was not included as a requirement in the project QAPP.

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The data user is cautioned that although the laboratory QC counts met the specified criteria, the acceptance range includes as much as a three-fold difference in asbestos concentrations for these samples. This range of variability is applicable to all asbestos results in this data set.

According to the QAPP provided with the data packages, field duplicates were required at a rate of 10% of field samples. Field duplicate pairs were not identified or evaluated as part of this validation effort.

VI. Identification

Identification of asbestos structures and fibers is dependent on sample preparation techniques, analyst training, instrument operation, and data interpretation. Comparison with results from known standards is used to evaluate the accuracy of the structure identification for field samples.

Actinolite, chrysotile, tremolite, edenite, and winchite were identified in the field and QC samples. According to the report forms provided in the QC package included with a previous data package shipment for the project, the laboratory correctly identified actinolite, chrysotile, and amosite in PE sample analyses performed in the third quarter of 2004. Comparison of identification between the various analysts, grid opening, and preparations combinations that make up the daily QC for these analyses, included separately with this shipment of data packages, were within acceptance limits. Therefore; based on the documentation provided, fiber and structure identifications for chrysotile, amosite, and actinolite were determined to be valid as reported. The identifications of tremolite, edenite, and winchite were supported with EDS confirmation, however, no documentation of reference materials for these mineral was included.

VII. Quantitation and Reported Detection Limits

Raw data documentation is reviewed to ensure that all reported results and detection limits are correctly calculated, accurately reported, and supported by the raw data.

With two exceptions, results for asbestos categories, fiber density, analytical sensitivity, and detection limits were correctly calculated and accurately reported by the laboratory and reported values were verified by the validator using the information included on the reporting forms and the chain of custody records.

Using the information provided in the data package the validator could not reproduce the results reported by the laboratory for sample CC5-H6-2CP-100604. The dilution factor listed on the prep log for this sample was four, however, using this value, the validator's calculated results were twice those of the laboratory. The laboratory was contacted and the data were rechecked. A correct dilution factor of four was verified by the laboratory on 9/23 and a corrected report form and EDD were supplied to the validator electronically.

VIII. System Performance

This parameter is evaluated to ensure that the laboratory analytical systems were functioning properly at the time of analyses and that methodology appropriate to the analyses were followed.

The analytical systems appear to have been working satisfactorily and to have been calibrated properly at the time of these analyses, based on the documentation provided in this data package shipment. Grid opening calibration and spot size calibration were not documented

IX. Documentation

Data and documentation completeness is critical in providing support for the reported results. Problems encountered with the nature or quality of the data package documentation are addressed.

For the sample prepared and analyzed as three QC pairs for this data set, a grid opening count of 84 was listed on the QC summary sheet. The count sheet for this sample documented that 85 grid openings were actually counted. Reported values were calculated using the correct number of grid openings, therefore, no action was required by the validator.

The sample identification for NFB-H2-3FD-100504 on the Form I matched the COC record. However, where listed in the QC data package narrative, this sample was identified as NFB-H2-3FD-100505, NFB-H2-3FD-100506, and NFB-H2-3FD-100507.

The grid opening counts documented on the sample preparation log did not match the number on the count sheets and Form Is for 22 of the samples in this data set. The grid openings listed on the Form Is matched the count sheet documentation in all cases, therefore, these were assumed to be the correct number and no action was taken by the validator on this issue.

No raw data were provided in the data package for the proficiency samples analyzed in support of the laboratory's accreditation. Raw data to support the identification of actinolite and amosite were received upon request on 1/26/05 in conjunction with validation of a previous shipment of data from the same project.

Raw data for chrysotile fibers identified in only selected field samples from this data set were provided. A listing of fiber verifications was provided and included at least one structure from each of the samples in which chrysotile was identified.

Count sheets included in the data package are computer generated forms. No date of the actual count is presented on these forms. If there is a corresponding bench sheet from which these forms are prepared, these should be supplied as a part of the data package. It is recommended that analyst's intials and date of count be added to the documentation.

The legend for the count sheets, which defines the codes used for the structure counts lists PSCH as the code for protocol chrysotile structures. The code appearing on the count sheets for this category is PCAS.

COMMENTS:

A. Using the information provided in the data package the validator could not reproduce the results reported by the laboratory for sample CC5-H6-2CP-100604. The dilution factor listed on the prep log for this sample was four, however, using this value, the validator's calculated results were twice those of the laboratory. The laboratory was contacted and the data were rechecked. A correct dilution factor of four was verified by the laboratory on 9/23 and a corrected report form and EDD were supplied to the validator electronically.

The laboratory reported results, analytical sensitivity, and detection limits to three significant figures. The data user should be aware that because all of these values are based on the counting of whole asbestos structures, the appropriate number of significant figures will be limited by the structure count. A total count of eight fibers will warrant results with only one significant figure; a count of 12 will warrant two, etc. Because the analytical sensitivity and detection limit are calculated from an assumed single asbestos structure, only one significant figure is accurate for these values, rather than the three reported by the laboratory. A second significant figure, if used, is considered estimated. The validator-calculated results, analytical sensitivities, and detection limits varied from the laboratory values in many cases, however, these discrepancies appeared to be due to rounding. The validator did not adjust the laboratory results to reduce the number of significant figures.

It is recommended that complete instrument calibration documentation be provided with every data package to fully support the site sample results.

The data results tables included as Table 1A include only the primary and total asbestos structure counts. Counts for individual categories required by the project Scope of Work are presented in the associated electronic data deliverables (EDD) tables.

This report was prepared according to the specifications of the analytical method, ISO Method 13794 " Ambient air - Determination of asbestos fibres - Indirect-transfer transmission electron microscopy method," the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," 10/99, and Trillium, Inc.'s SOP No. 0497-06A, for Validation of Analytical Data: Inorganic Analytes.

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document, "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," 2/94.

U   The analyte was analyzed for, but was not detected above the level of the reported value. The reported value is either the sample quantitation limit or the sample detection limit.

L   Indicates results which fall between the sample detection limit and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J   The associated value is an estimated quantity. The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R   The data are unusable. The analyte was analyzed for, but the presence <u>or</u> absence of the analyte cannot be verified.

UJ   A combination of the "U" and "J" qualifier. The analyte was analyzed for but was not detected. The reported value is an estimate and may be inaccurate or imprecise.

041188R15TEM

Data Validation Report

TDD No: 09-04-01-0011
PAN: 001275.0440.01TA
Site: El Dorado Hills
Laboratory: Lab/Cor, Inc.
Reviewer: Denise A. Shepperd, Trillium, Inc.
Date: May 24, 2005
               Revised August 11, 2005

I.   Case Summary

SAMPLE INFORMATION:

Asbestos Samples:	CC6-L6-1CB-100704; CC6-L6-2CB-100704; CC6-L6-3CB-100704; NYB-H2-1FD-100704; NYB-H2-2FD-100704; NYB-L2-11CH-100704; NYB-L2-1CH-100704; NYB-L2-3CH-100704; NYB-L2-4CH-100704; NYB-L2-5CH-100704; CC9-L6-11CA-101004; CC9-L6-1CA-101004; CC9-L6-2CC-101004; CC9-L6-3CC-101004; JEG-L2-15CH-101004; JEG-L2-1AD-101004; JEG-L2-1CH-101004; JEG-L2-2CH-101004; JEG-L2-3CH-101004; JEG-L2-4CH-101004; JEG-L2-5CH-101004; NYB-H2-12FD-100704; NYB-H2-3FD-100704; JEG-H2-1FD-101004; JEG-H2-2FD-101004; and JEG-H2-5FD-101004
Matrix:	26 Air samples
Analysis:	Asbestos by Transmission Electron Microscopy
Collection Dates:	October 7 and 10, 2004
Sample Receipt Date:	October 12, 2004
Filter Preparation Date:	January 11 through March 30, 2005
Grid Preparation Date:	March 7 through March 30, 2005
TEM Analysis Dates:	March 8 through April 15, 2005
Analytical Method:	ISO Method 13794

FIELD QC:

Field Trip Blanks (ZB):	NFB-L2-1ZB-10050; SFBB-L2-1ZB-10060; NYB-L2-1ZB-10070; JEG-L2-1ZB-10070; SRA-1ZB-1008004
Filter Blanks (FB):	SFBA-L2-FB-10050; JEG-L2-FB-101004; NRA-FB-101004
Column Balnk (FB):	NRA-FB-101005
Equipment Blanks (EB):	
Method Blank (MB):	4 glass filter blanks
Field Duplicates (D1):	Not Identified

TABLES:

1A: Analytical Results with Qualifications
1B: Data Qualifier Definitions for Inorganic Data Review

SAMPLING ISSUES:

No chain of custody documents were provided in the data package. Chain of custody documentation that included these samples was provided on 5/4/05 by electronic transfer, at the request of the validator.

VALIDATION PARAMETERS AND COMMENTS:

I. Holding Times, Preservation and Sample Integrity

This parameter is evaluated to ensure that sample custody is documented from collection through analysis, samples are analyzed within the recommended holding time, and that no alteration in sample content has occurred during sample shipment, handling, and storage.

There is no established holding time or storage condition for asbestos samples.

A total of six COC records were used to document the collection of these samples. Only the first of these six records was signed and dated as relinquished. All six records were initialed or signed and dated on receipt at the laboratory (however, no time was recorded). Each of these records should contain the signature of each sample custodian as well as the date and time of transfer, every time that the samples change hands, in order to preserve the integrity of the samples.

II. Calibration

The analyses of materials of known content ensures that identification and quantitation of analytes will be accurate for all samples.. Review of the documentation provided for appropriate calibration determines whether or not the analytical results reported by the laboratory are valid and supported by the data.

The data deliverables for this project were included in multiple data packages in several shipments. Instrument calibration documentation was provided in a separate data package in association with the site sample data packages in this shipment and included camera and screen magnification calibration (performed 4/7/05 to 4/13/05), camera length and constant calibration (performed 4/5/05 to 4/14/05), EDS peak resolution check (performed on 4/7/05), and maintenance logs for both instruments used for analyses, covering the months of March and April of 2005.

A form entitled "Microscope Based Quality Control" for the month of April 2005 was included. This form listed the various instrument calibration parameters, required frequencies, dates performed, and results. According to this form, k-factor calibration was performed most recently on the two microscopes on 1/11/05 and 3/14/05; beam dose was calibrated on 2/9/05 and 3/18/05.

No documentation of grid opening size was provided.

Documentation to support the identification and quantitation in the site samples in these data packages was provided separately with a previous shipment of data packages from the same project, and included the following:

A letter representing documentation of an NVLAP laboratory site assessment conducted on 11/7/03 was included in the data package. The letter, dated 5/10/04, indicated that the laboratory met the on-site assessment requirements.

Results and evaluator notes and tables were included for an NISTIR 5351 analysis of an inter-laboratory QC sample. The laboratory's raw data were compiled and assessed by Batta Labs. Analysts were identified by initials

and included two of the analysts' initials documented with this sample set. "DW" and "KM" performed these PE sample analyses, "JH" and "TM" were not represented. According to the assessor's notes, the sample included chrysotile fibers and structures and the laboratory's results were within NVLAP and NISTIR 5351 acceptance limits. No raw data were provided for this QC sample in the original data package. Raw data were provided under separate cover, at the request of the validator.

Results for a New York State Department of Health Environmental Laboratory Approval Program proficiency test, conducted between 9/7/04 and 11/9/04, were also included. The proficiency samples included asbestos in air. The laboratory's results were satisfactory for all four of the air sample categories. Actinolite and amosite fiber types were identified and counts were acceptable, according to the data sheet. No raw data were provided for this proficiency sample. Upon request, the laboratory provided raw data documenting the identification of actinolite and amosite asbestos on 1/27/05, in conjunction with the validation of a previous shipment of data packages. These data were inserted by the validator into the QC data package provided, as supporting data, with the previous shipment of data packages.

Documentation for a round-robin sample analyzed in the fall of 2004, by three separate laboratories, as part of the NVLAP requirements, was also included in the QC data package. The documentation included raw count sheets and reported results, as well as comparison with other laboratories' results. Results for all parameters were acceptable. According to the documentation, the only analyst who participated in these analyses was "DW."

Based on the fact that the laboratory demonstrated proficiency in the performance evaluation (PE) analyses performed in the third quarter of 2004, and that these PE samples included the two predominant asbestos types detected in this field sample set, no action was taken by the validator.

III. Blanks

Sample matrices known to be devoid of the analytes of interest (method blanks) are prepared and analyzed with each analytical batch. Evaluation of this parameter ensures that contamination introduced during preparation and analyses is not attributed to the field samples.

Other blanks may be generated in the field or laboratory to ensure that no contamination is introduced during sampling and/or storage.

No field-generated blanks were included with this data set.

The laboratory preparation list and log indicated that one laboratory preparation filter blank was prepared and analyzed by the indirect method in association with the entire 70-sample set (041172, 041188, 041191, 141210, and 050680). No raw data were supplied for this blank, but a value of "0" structures detected was present on the QC summary form. According to the prep sheets, this blank was prepared on 1/13/05 (ashed and "hydrolyzed") and 3/16/05 (grid preparation). This blank would be an indicator of any contamination present in the blank filters used for preparation and for any contamination present in the prep lab environment on 1/13/05 and 3/16/05. Some of the samples in this data set were prepared on these dates.

The indirect method used (ISO 13794), recommends analyzing a filter blank and a beaker blank with each set of samples prepared. In addition, it is recommended that the laboratory include an unused filter for preparation with every microscope slide containing sample filters that is prepared. These blanks were not documented with this data set. Without the appropriate blanks it is not possible to assess the presence or absence of laboratory contamination or its impact on the site sample results.

The laboratory had prepared blanks with the preparation and analyses of samples in this data set. At the client's request the laboratory analyzed a percentage of the prepared blanks. Data for these blanks were received by the

validator on July 6, 2005. Four filter blanks, five field trip blanks, four glass filter blanks, and one column blank were prepared and analyzed as laboratory blanks. No asbestos structures were detected in any of the blanks.

IV. Spiked Samples

The analytes of interest are added in known concentrations to like-matrix blanks or authentic field samples before preparation. This parameter is evaluated in order to assess the laboratory's ability to preserve and recover the compounds of interest.

The analytical method does not require laboratory spiked sample analyses. It is recommended by the validator that some type of laboratory prepared or purchased spiked analyses be performed with each analytical sample batch.

The project requirements specified that results from the most recent inter-laboratory study would be acceptable as a laboratory control sample (LCS) for these data. This requirement was met by the laboratory and results, reported with previous data submissions for this project, for the inter-laboratory study sample were acceptable for all air sample parameters (see Section I). The data user should note, however, that no reference material was prepared and analyzed by the indirect method (ISO 13794) employed for the preparation and analyses of the site samples. This method is used when filter loading is too high to allow the use of the direct method (ISO 10312) and depends on recovery of material from the air-sampling filter, resuspension in solution, effecting a dilution, and redistribution on a secondary filter which is then prepared as for the direct TEM analysis method. Because there are additional steps involved in the preparation, there are additional error factors introduced. It is recommended that a reference material be prepared and analyzed by the indirect method so that performance can be tracked by the laboratory for support of field sample analyses by this procedure.

V. Duplicate/Replicate Samples

Results for duplicate/replicate samples are evaluated to assess the laboratory's precision for the analytes of interest in the applicable sample matrix. For asbestos analyses, duplicate and replicate measurements take the form of a combination of variables which include the preparation of the grid, the choice of grid openings to be analyzed, and the analyst performing the counting and identification of structures. For the indirect method the variables should also include preparation of the filter itself.

The laboratory included all of the QC samples prepared from all of the field sample sets in this shipment in a separate data package under a separate report number (050580).

Two analysts, JH and TM, not represented in the PE sample analyses included with the data packages for this project, did perform intra-laboratory replicate and duplicate analyses on associated field samples. Results for these QC analyses for these analysts were within the sample-specific acceptance limits stipulated by the method.

The quality assurance project plan (QAPP) requires five types of laboratory duplicate/replicate analyses, each to be performed at a rate of 5% (one for every twenty) of the field samples. Based on the total of samples prepared by the indirect method and included in all of the data packages in this shipment combined (70 samples), four or more of each of these QC sample pairs were required (a total of 20 QC sample pairs).

The laboratory compared the primary asbestos structure count for each of the QC samples prepared and analyzed. Results for all of the duplicate/replicate pair types were evaluated based on 95% confidence limits determined from the original sample count. Results for all of the reported QC samples were within the laboratory's calculated limits.

Four of the samples (NYB-H2-3FD-100704; JEG-H2-1FD-101004, JEG-H2-2FD-1001004; and JEG-H2-5FD-1001004) in this data set (041191) were prepared and/or analyzed as one or more different QC pairs. According

to the sample preparation list and log, two different indirect preparations were done with JEG-H2-2FD-101004. It is not clear from the documentation at which point in the preparation process the duplication was produced. The sample is listed under the original sample identification and also under the number assigned for the separate QC sample batch. It appears that the sample collection filter was cut into pieces before ashing and these separate pieces were processed as duplicates. The new preparation was counted by the same analyst as the original as well as by a second analyst; results fell within the 95% confidence limits (13-32) generated from the original sample count of 21 structures.

Six of the samples from the data set were counted as duplicates by a second analyst, three by counting the same grid openings, and three by counting different ones. Three of the samples in the data set were also analyzed as replicate pairs in which the same analyst recounted the same grid openings. Counts for all of these paired analyses fell within the 95% confidence limits.

In summary, the laboratory analyzed a total of 11 QC sample pairs from three of the five associated data sets. A summary of the laboratory QC samples analyzed is as follows:

Replicate analyses:

- Two samples were analyzed as replicates, wherein a different preparation was analyzed by the same analyst.

Duplicate analyses:

- Three samples were analyzed as duplicates, wherein the same grid openings were recounted by a different analyst;

- Three samples were analyzed as duplicates, wherein different grid openings were selected for counting by a different analyst; and

- Three samples were analyzed as duplicates, wherein a different analyst counted a different preparation.

No samples were analyzed as replicates, wherein the same analyst re-counts the same sample a second time counting different grid openings.

According to the preparation list and log, two samples (one from 041188 and one from 041191) were re-prepared on 3/29/05 and 3/30/05. The second preparation of these two samples involved ashing the filters for two hours, according to notes on the prep list. According to the documentation provided, these were the only samples which were carried through all of the filtering and grid preparation steps. Other QC samples listed as repreps were assumed to be additional grid preparations from the same filter only. The length of filter ashing time for the original sample preparations was not recorded.

Agreement between the results for all of the 11 sample QC pairs analyzed in conjunction with the combined project-related laboratory batches in four of the required categories were acceptable. In addition, four samples were re-analyzed by the same analyst counting the same grid openings. These results were also acceptable according to the laboratory-specified limits. This category was not included as a requirement in the project QAPP.

The data user is cautioned that although the laboratory QC counts met the specified criteria, the acceptance range includes as much as a three-fold difference in asbestos concentrations for these samples. This range of variability is applicable to all asbestos results in this data set.

According to the QAPP provided with the data packages, field duplicates were required at a rate of 10% of field samples. Field duplicate pairs were not identified or evaluated as part of this validation effort.

VI. Identification

Identification of asbestos structures and fibers is dependent on sample preparation techniques, analyst training, instrument operation, and data interpretation. Comparison with results from known standards is used to evaluate the accuracy of the structure identification for field samples.

No dimensions were recorded for one or more structures in two samples (CC6-L6-2CB-100704 and JEG-L2-5CH-101004), therefore, the identification criteria could not be verified by the validator. Results for counts in these two samples were qualified as estimated (J) on this basis.

Actinolite, chrysotile, amosite, tremolite, edenite, and anthophyllite were identified in the field and QC samples. According to the report forms provided in the QC package included with a previous data package shipment for the project, the laboratory correctly identified actinolite, chrysotile, and amosite in PE sample analyses performed in the third quarter of 2004. Comparison of identification between the various analysts, grid opening, and preparations combinations that make up the daily QC for these analyses, included separately with this shipment of data packages, were within acceptance limits. Therefore; based on the documentation provided, fiber and structure identifications for chrysotile, amosite, and actinolite were determined to be valid as reported. The identifications of tremolite, edenite, and anthophyllite were supported with EDS confirmation, however, no documentation of reference materials for these mineral was included.

VII. Quantitation and Reported Detection Limits

Raw data documentation is reviewed to ensure that all reported results and detection limits are correctly calculated, accurately reported, and supported by the raw data.

With the exceptions noted below, results for asbestos categories, fiber density, analytical sensitivity, and detection limits were correctly calculated and accurately reported by the laboratory and reported values were verified by the validator using the information included on the reporting forms and the chain of custody records.

Using the information provided in the data package the validator could not reproduce the results reported by the laboratory for eight of the samples in this data set. The dilution factor listed on the prep log for these samples was three, however, using this value, the validator's calculated results were greater than those of the laboratory. The discrepancy appears to have occurred due to the rounding of the actual dilution factor, 2.7, to 3. The validator did not correct the results to reflect the rounded dilution factor. Samples affected are:

CC6-L6-2CB-100704	CC6-L6-3CB-100704	NYB-L2-4CH-100704
CC9-L6-1CA-101004	JEG-L2-1CH-101004	JEG-L2-15CH-101004
JEG-H2-1FD-101004	JEG-L2-2CH-101004	

VIII. System Performance

This parameter is evaluated to ensure that the laboratory analytical systems were functioning properly at the time of analyses and that methodology appropriate to the analyses were followed.

The analytical systems appear to have been working satisfactorily and to have been calibrated properly at the time of these analyses, based on the documentation provided in this data package shipment. Grid opening calibration and spot size calibration were not documented

IX. Documentation

Data and documentation completeness is critical in providing support for the reported results. Problems encountered with the nature or quality of the data package documentation are addressed.

The sample identification for JEG-H2-2FD-101004 on the sample Form I matched the COC record. However, where listed in the QC data package narrative and Form I, this sample was identified as JEG-H2-2FD-101005 and JEG-H2-2FD-101006.

The sample identification for JEG-H2-5FD-101004 on the sample Form I matched the COC record. However, where listed in the QC data package narrative and Form I, this sample was identified as JEG-H2-5FD-101007 and JEG-H2-5FD-101009.

The grid opening counts documented on the sample preparation log did not match the number on the count sheets and Form Is for seven of the samples in this data set. The grid openings listed on the Form Is matched the count sheet documentation in all cases, therefore, these were assumed to be the correct number and no action was taken by the validator on this issue.

No raw data were provided in the data package for the proficiency samples analyzed in support of the laboratory's accreditation. Raw data to support the identification of actinolite and amosite were received upon request on 1/26/05 in conjunction with validation of a previous shipment of data from the same project.

Raw data for chrysotile fibers identified in only selected field samples from this data set were provided. A listing of fiber verifications was provided and included at least one structure from each of the samples in which chrysotile was identified.

Count sheets included in the data package are computer generated forms. No date of the actual count is presented on these forms. If there is a corresponding bench sheet from which these forms are prepared, these should be supplied as a part of the data package. It is recommended that analyst's intials and date of count be added to the documentation.

The legend for the count sheets, which defines the codes used for the structure counts lists PSCH as the code for protocol chrysotile structures. The code appearing on the count sheets for this category is PCAS.

COMMENTS:

A. No dimensions were recorded for one or more structures in two samples (CC6-L6-2CB-100704 and JEG-L2-5CH-101004), therefore, the identification criteria could not be verified by the validator. Results for counts in these two samples were qualified as estimated (J) on this basis.

B. Using the information provided in the data package the validator could not reproduce the results reported by the laboratory for eight of the samples in this data set. The dilution factor listed on the prep log for these samples was three, however, using this value, the validator's calculated results were greater than those of the laboratory. The discrepancy appears to have occurred due to the rounding of the actual dilution factor, 2.7, to 3. The validator did not correct the results to reflect the rounded dilution factor. Samples affected are:

CC6-L6-2CB-100704   CC6-L6-3CB-100704   NYB-L2-4CH-100704

The laboratory reported results, analytical sensitivity, and detection limits to three significant figures. The data user should be aware that because all of these values are based on the counting of whole asbestos structures, the appropriate number of significant figures will be limited by the structure count. A total count of eight fibers will warrant results with only one significant figure; a count of 12 will warrant two, etc. Because the analytical sensitivity and detection limit are calculated from an assumed single asbestos structure, only one significant figure is accurate for these values, rather than the three reported by the laboratory. A second significant figure, if used, is considered estimated. The validator-calculated results, analytical sensitivities, and detection limits varied from the laboratory values in many cases, however, these discrepancies appeared to be due to rounding. The validator did not adjust the laboratory results to reduce the number of significant figures.

It is recommended that complete instrument calibration documentation be provided with every data package to fully support the site sample results.

The data results tables included as Table 1A include only the primary and total asbestos structure counts. Counts for individual categories required by the project Scope of Work are presented in the associated electronic data deliverables (EDD) tables.

This report was prepared according to the specifications of the analytical method, ISO Method 13794 " Ambient air - Determination of asbestos fibres - Indirect-transfer transmission electron microscopy method," the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," 10/99, and Trillium, Inc.'s SOP No. 0497-06A, for Validation of Analytical Data: Inorganic Analytes.

TRILLIUM INC.

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document, "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," 2/94.

U   The analyte was analyzed for, but was not detected above the level of the reported value. The reported value is either the sample quantitation limit or the sample detection limit.

L   Indicates results which fall between the sample detection limit and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J   The associated value is an estimated quantity. The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R   The data are unusable. The analyte was analyzed for, but the presence or absence of the analyte cannot be verified.

UJ   A combination of the "U" and "J" qualifier. The analyte was analyzed for but was not detected. The reported value is an estimate and may be inaccurate or imprecise.

041191R11TEM

<div align="right">TRILLIUMINC.</div>

Data Validation Report

TDD No: 09-04-01-0011
PAN: 001275.0440.01TA
Site: El Dorado Hills
Laboratory: Lab/Cor, Inc.
Reviewer: Denise A. Shepperd, Trillium, Inc.
Date: May 20, 2005
                Revised August 11, 2005

I.   Case Summary

SAMPLE INFORMATION:

Asbestos Samples:	SRA-R04-100704; SRA-R03-100704; SRA-R05-100704; SRA-R02-100704; NRA-R101-101004; NRA-R01-101004; NRA-R05-101004; NRA-R04-101004; NRA-R03-101004; and NRA-R02-101004
Matrix:	10 Air samples
Analysis:	Asbestos by Transmission Electron Microscopy
Collection Dates:	October 7 and 10, 2004
Sample Receipt Date:	October 14, 2004
Filter Preparation Date:	April 8 and 9, 2005
Grid Preparation Date:	April 11, 2005
TEM Analysis Dates:	April 18 and 19, 2005
Analytical Method:	ISO Method 13794

FIELD QC:

Field Trip Blanks (ZB):	NFB-L2-1ZB-10050; SFBB-L2-1ZB-10060; NYB-L2-1ZB-10070; JEG-L2-1ZB-10070; SRA-1ZB-1008004
Filter Blanks (FB):	SFBA-L2-FB-10050; JEG-L2-FB-101004; NRA-FB-101004
Column Balnk (FB):	NRA-FB-101005
Equipment Blanks (EB):	
Method Blank (MB):	4 glass filter blanks
Field Duplicates (D1):	Not Identified

TABLES:

1A:	Analytical Results with Qualifications
1B:	Data Qualifier Definitions for Inorganic Data Review

SAMPLING ISSUES:

No chain of custody documents were provided in the data package. These samples were originally received by the laboratory as sample lot number 041210. Chain of custody documentation that included these samples was provided on 5/4/05 by electronic transfer, at the request of the validator.

VALIDATION PARAMETERS AND COMMENTS:

I. Holding Times, Preservation and Sample Integrity

This parameter is evaluated to ensure that sample custody is documented from collection through analysis, samples are analyzed within the recommended holding time, and that no alteration in sample content has occurred during sample shipment, handling, and storage.

There is no established holding time or storage condition for asbestos samples.

II. Calibration

The analyses of materials of known content ensures that identification and quantitation of analytes will be accurate for all samples. Review of the documentation provided for appropriate calibration determines whether or not the analytical results reported by the laboratory are valid and supported by the data.

The data deliverables for this project were included in multiple data packages in several shipments. Instrument calibration documentation was provided in a separate data package in association with the site sample data packages in this shipment and included camera and screen magnification calibration (performed 4/7/05 to 4/13/05), camera length and constant calibration (performed 4/5/05 to 4/14/05), EDS peak resolution check (performed on 4/7/05), and maintenance logs for both instruments used for analyses, covering the months of March and April of 2005.

A form entitled "Microscope Based Quality Control" for the month of April 2005 was included. This form listed the various instrument calibration parameters, required frequencies, dates performed, and results. According to this form, k-factor calibration was performed most recently on the two microscopes on 1/11/05 and 3/14/05; beam dose was calibrated on 2/9/05 and 3/18/05.

No documentation of grid opening size was provided.

Documentation to support the identification and quantitation in the site samples in these data packages was provided separately with a previous shipment of data packages from the same project, and included the following:

A letter representing documentation of an NVLAP laboratory site assessment conducted on 11/7/03 was included in the data package. The letter, dated 5/10/04, indicated that the laboratory met the on-site assessment requirements.

Results and evaluator notes and tables were included for an NISTIR 5351 analysis of an inter-laboratory QC sample. The laboratory's raw data were compiled and assessed by Batta Labs. Analysts were identified by initials and included two of the analysts' initials documented with this sample set. "DW" and "KM" performed these PE sample analyses,. "JH" and "TM" were not represented. According to the assessor's notes, the sample included chrysotile fibers and structures and the laboratory's results were within NVLAP and NISTIR 5351 acceptance limits. No raw data were provided for this QC sample in the original data package. Raw data were provided under separate cover, at the request of the validator.

Results for a New York State Department of Health Environmental Laboratory Approval Program proficiency test, conducted between 9/7/04 and 11/9/04, were also included. The proficiency samples included asbestos in air. The laboratory's results were satisfactory for all four of the air sample categories. Actinolite and amosite fiber types

were identified and counts were acceptable, according to the data sheet. No raw data were provided for this proficiency sample. Upon request, the laboratory provided raw data documenting the identification of actinolite and amosite asbestos on 1/27/05, in conjunction with the validation of a previous shipment of data packages. These data were inserted by the validator into the QC data package provided, as supporting data, with the previous shipment of data packages.

Documentation for a round-robin sample analyzed in the fall of 2004, by three separate laboratories, as part of the NVLAP requirements, was also included in the QC data package. The documentation included raw count sheets and reported results, as well as comparison with other laboratories' results. Results for all parameters were acceptable. According to the documentation, the only analyst who participated in these analyses was "DW."

Based on the fact that the laboratory demonstrated proficiency in the performance evaluation (PE) analyses performed in the third quarter of 2004, and that these PE samples included the two predominant asbestos types detected in this field sample set, no action was taken by the validator.

III. Blanks

Sample matrices known to be devoid of the analytes of interest (method blanks) are prepared and analyzed with each analytical batch. Evaluation of this parameter ensures that contamination introduced during preparation and analyses is not attributed to the field samples.

Other blanks may be generated in the field or laboratory to ensure that no contamination is introduced during sampling and/or storage.

No field-generated blanks were included with this data set.

The laboratory preparation list and log indicated that one laboratory preparation filter blank was prepared and analyzed by the indirect method in association with the entire 70-sample set (041172, 041188, 041191, 141210, and 050680). No raw data were supplied for this blank, but a value of "0" structures detected was present on the QC summary form. According to the prep sheets, this blank was prepared on 1/13/05 (ashed and "hydrolyzed") and 3/16/05 (grid preparation). This blank would be an indicator of any contamination present in the blank filters used for preparation and for any contamination present in the prep lab environment on 1/13/05 and 3/16/05, but it does not address contamination issues for the dates on which the samples in this data set (050680) were prepared.

The indirect method used (ISO 13794), recommends analyzing a filter blank and a beaker blank with each set of samples prepared. In addition, it is recommended that the laboratory include an unused filter for preparation with every microscope slide containing sample filters that is prepared. None of these blanks were documented with this data set. Without blanks it is not possible to assess the presence or absence of laboratory contamination or its impact on the site sample results.

The laboratory had prepared blanks with the preparation and analyses of samples in this data set. At the client's request the laboratory analyzed a percentage of the prepared blanks. Data for these blanks were received by the validator on July 6, 2005. Four filter blanks, five field trip blanks, four glass filter blanks, and one column blank were prepared and analyzed as laboratory blanks. No asbestos structures were detected in any of the blanks.

IV. Spiked Samples

The analytes of interest are added in known concentrations to like-matrix blanks or authentic field samples before preparation. This parameter is evaluated in order to assess the laboratory's ability to preserve and recover the compounds of interest.

The analytical method does not require laboratory spiked sample analyses. It is recommended by the validator that some type of laboratory prepared or purchased spiked analyses be performed with each analytical sample batch.

The project requirements specified that results from the most recent inter-laboratory study would be acceptable as a laboratory control sample (LCS) for these data. This requirement was met by the laboratory and results, reported with previous data submissions for this project, for the inter-laboratory study sample were acceptable for all air sample parameters (see Section I). The data user should note, however, that no reference material was prepared and analyzed by the indirect method (ISO 13794) employed for the preparation and analyses of the site samples. This method is used when filter loading is too high to allow the use of the direct method (ISO 10312) and depends on recovery of material from the air-sampling filter, resuspension in solution, effecting a dilution, and redistribution on a secondary filter which is then prepared as for the direct TEM analysis method. Because there are additional steps involved in the preparation, there are additional error factors introduced. It is recommended that a reference material be prepared and analyzed by the indirect method so that performance can be tracked by the laboratory for support of field sample analyses by this procedure.

V. Duplicate/Replicate Samples

Results for duplicate/replicate samples are evaluated to assess the laboratory's precision for the analytes of interest in the applicable sample matrix. For asbestos analyses, duplicate and replicate measurements take the form of a combination of variables which include the preparation of the grid, the choice of grid openings to be analyzed, and the analyst performing the counting and identification of structures. For the indirect method the variables should also include preparation of the filter itself.

The laboratory included all of the QC samples from all of the field sample sets in this shipment in a separate data package under a separate report number (050580).

Two analysts, JH and TM, not represented in the PE sample analyses included with the data packages for this project, did perform intra-laboratory replicate and duplicate analyses on associated field samples. Results for these QC analyses for these analysts were within the sample-specific acceptance limits stipulated by the method.

The quality assurance project plan (QAPP) requires five types of laboratory duplicate/replicate analyses, each to be performed at a rate of 5% (one for every twenty) of the field samples. Based on the total of samples prepared by the indirect method and included in all of the data packages in this shipment combined (70 samples), four or more of each of these QC sample pairs were required (a total of 20 QC sample pairs).

The laboratory compared the primary asbestos structure count for each of the QC samples prepared and analyzed. Results for all of the duplicate/replicate pair types were evaluated based on 95% confidence limits determined from the original sample count result. Results for all of the reported QC samples were within the laboratory's calculated limits.

None of the samples in this data set (050680) was prepared as a QC pair. The laboratory analyzed a total of 11 QC sample pairs from three of the five associated data sets. A summary of the laboratory QC samples analyzed is as follows:

Replicate analyses:

- Two samples were analyzed as replicates, wherein a different preparation was analyzed by the same analyst;

Duplicate analyses:

- Three samples were analyzed as duplicates, wherein the same grid openings were recounted by a different analyst;

- Three samples were analyzed as duplicates, wherein different grid openings were selected for counting by a different analyst;

- Three samples were analyzed as duplicates, wherein a different analyst counted a different preparation.

No samples were analyzed as replicates, wherein the same analyst re-counts the same sample a second time counting different grid openings.

According to the preparation list and log, two samples (from 041188 and 041191) were re-prepared on 3/29/05 and 3/30/05. The second preparation of these two samples involved ashing the filters for two hours, according to notes on the prep list. It was assumed by the validator that these were the only samples which were carried through all of the filtering and grid preparation steps. Other QC samples listed as repreps were assumed to be additional grid preparations from the same filter only.

Agreement between the results for the 11 sample QC pairs analyzed in conjunction with the combined project-related laboratory batches in four of the required categories were acceptable. In addition, four samples were re-analyzed by the same analyst counting the same grid openings. These results were also acceptable according to the laboratory-specified limits. This category was not included as a requirement in the project QAPP.

The data user is cautioned that although the laboratory QC counts met the specified criteria, the acceptance range includes as much as a three-fold difference in asbestos concentrations for these samples. This range of variability is applicable to all asbestos results in this data set.

According to the QAPP provided with the data packages, field duplicates were required at a rate of 10% of field samples. Field duplicate pairs were not identified or evaluated as part of this validation effort.

VI. Identification

Identification of asbestos structures and fibers is dependent on sample preparation techniques, analyst training, instrument operation, and data interpretation. Comparison with results from known standards is used to evaluate the accuracy of the structure identification for field samples.

Actinolite, chrysotile, and winchite were identified in the field and QC samples. According to the report forms provided in the QC package included with a previous data package shipment for the project, the laboratory correctly identified actinolite, chrysotile, and amosite in PE sample analyses performed in the third quarter of 2004. Comparison of identification between the various analysts, grid opening, and preparations combinations that make up the daily QC for these analyses, included separately with this shipment of data packages, were within acceptance limits. Therefore; based on the documentation provided, fiber and structure identifications for chrysotile and actinolite were determined to be valid as reported. The identification of winchite was supported with EDS confirmation, however, no documentation of a reference material for this mineral was included.

VII. Quantitation and Reported Detection Limits

Raw data documentation is reviewed to ensure that all reported results and detection limits are correctly calculated, accurately reported, and supported by the raw data.

- Results for asbestos categories, fiber density, and detection limits were correctly calculated and accurately reported by the laboratory. Results were verified by the validator using the information included on the reporting forms and the chain of custody records.

VIII. System Performance

This parameter is evaluated to ensure that the laboratory analytical systems were functioning properly at the time of analyses and that methodology appropriate to the analyses were followed.

The analytical systems appear to have been working satisfactorily and to have been calibrated properly at the time of these analyses, based on the documentation provided in this data package shipment. Grid opening calibration and spot size calibration were not documented

IX. Documentation

Data and documentation completeness is critical in providing support for the reported results. Problems encountered with the nature or quality of the data package documentation are addressed.

The volume of air filtered for sample NRA-R01-101004 was recorded on the COC record and the laboratory prep log as 5186.26. The volume listed on the Form I for this sample was 5186.25. This number was corrected by the validator to agree with the raw data. No adjustments to structure concentrations were necessary.

No raw data were provided in the data package for the proficiency samples analyzed in support of the laboratory's accreditation. Raw data to support the identification of actinolite and amosite were received upon request on 1/26/05 in conjunction with validation of a previous shipment of data from the same project.

Raw data for chrysotile fibers identified in only selected field samples from this data set were provided. A listing of fiber verifications was provided and included at least one structure from each of the samples in which chrysotile was identified.

Count sheets included in the data package are computer generated forms. No date of the actual count is presented on these forms. If there is a corresponding bench sheet from which these forms are prepared, these should be supplied as a part of the data package. It is recommended that analyst's intials and date of count be added to the documentation.

The legend for the count sheets, which defines the codes used for the structure counts lists PSCH as the code for protocol chrysotile structures. The code appearing on the count sheets for this category is PCAS.

COMMENTS:

These samples were analyzed by both the direct (ISO 10312) and indirect (ISO 13794) methods in order to provide comparison between the methods. In making the comparison the data user should note that the ten samples chosen had very low counts in the direct method are not appropriate for analysis by the indirect method, which is designed to accommodate the analysis of highly loaded filters. Therefore, criteria for comparison between the paired results should be chosen carefully to avoid the bias inherent in 95% confidence limits at very low concentrations. Samples with much higher structure counts would be a better choice for comparison of these two methods.

A. The volume of air filtered for sample NRA-R01-101004 was recorded on the COC record and the laboratory prep log as 5186.26. The volume listed on the Form I for this sample was 5186.25. This number was corrected by the validator to agree with the raw data. No adjustments to structure concentrations was necessary.

The laboratory reported results, analytical sensitivity, and detection limits to three significant figures. The data user should be aware that because all of these values are based on the counting of whole asbestos structures, the appropriate number of significant figures will be limited by the structure count. A total count of eight fibers will warrant results with only one significant figure; a count of 12 will warrant two, etc. Because the analytical sensitivity and detection limit are calculated from an assumed single asbestos structure, only one significant figure is accurate for these values, rather than the three reported by the laboratory. A second significant figure, if used, is considered estimated. The validator-calculated results, analytical sensitivities, and detection limits varied from the laboratory values in many cases, however, these discrepancies appeared to be due to rounding. The validator did not adjust the laboratory results to reduce the number of significant figures.

It is recommended that complete instrument calibration documentation be provided with every data package to fully support the site sample results.

The data results tables included as Table 1A include only the primary and total asbestos structure counts. Counts for individual categories required by the project Scope of Work are presented in the associated electronic data deliverables (EDD) tables.

This report was prepared according to the specifications of the analytical method, ISO Method 13794 " Ambient air - Determination of asbestos fibres - Indirect-transfer transmission electron microscopy method," the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," 10/99, and Trillium, Inc.'s SOP No. 0497-06A, for Validation of Analytical Data: Inorganic Analytes.

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document, "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," 2/94.

U   The analyte was analyzed for, but was not detected above the level of the reported value. The reported value is either the sample quantitation limit or the sample detection limit.

L   Indicates results which fall between the sample detection limit and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J   The associated value is an estimated quantity. The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R   The data are unusable. The analyte was analyzed for, but the presence or absence of the analyte cannot be verified.

UJ   A combination of the "U" and "J" qualifier. The analyte was analyzed for but was not detected. The reported value is an estimate and may be inaccurate or imprecise.

050608R01TEM

Data Validation Report

TDD No:	09-04-01-0011
PAN:	001275.0440.01TA
Site:	El Dorado Hills
Laboratory:	Lab/Cor, Inc.
Reviewer:	Denise A. Shepperd, Trillium, Inc.
Date:	May 19, 2005
	Revised August 11, 2005

I.   Case Summary

SAMPLE INFORMATION:

Asbestos Samples:	APG-L2-13CH-100404; APG-L2-1CH-100404; and CC1-L6-3CB-100204
Matrix:	3 Air samples
Analysis:	Asbestos by Transmission Electron Microscopy
Collection Dates:	October 2 through 4, 2004
Sample Receipt Date:	October 7, 2004
Filter Preparation Date:	January 7, 2005
Grid Preparation Date:	January 21, 2005
TEM Analysis Dates:	February 7and 8, 2005
Analytical Method:	ISO Method 13794

FIELD QC:

Field Trip Blanks (ZB):	NFB-L2-1ZB-10050; SFBB-L2-1ZB-10060; NYB-L2-1ZB-10070; JEG-L2-1ZB-10070; SRA-1ZB-1008004
Filter Blanks (FB):	SFBA-L2-FB-10050; JEG-L2-FB-101004; NRA-FB-101004
Column Balnk (FB):	NRA-FB-101005
Equipment Blanks (EB):	
Method Blank (MB):	4 glass filter blanks
Field Duplicates (D1):	Not Identified

TABLES:

1A:	Analytical Results with Qualifications
1B:	Data Qualifier Definitions for Inorganic Data Review

SAMPLING ISSUES:

No chain of custody documents were provided in the data package. Chain of custody documentation that included these samples was provided on 5/4/05 by electronic transfer, at the request of the validator.

VALIDATION PARAMETERS AND COMMENTS:

I. Holding Times, Preservation and Sample Integrity

This parameter is evaluated to ensure that sample custody is documented from collection through analysis, samples are analyzed within the recommended holding time, and that no alteration in sample content has occurred during sample shipment, handling, and storage.

There is no established holding time or storage condition for asbestos samples.

II. Calibration

The analyses of materials of known content ensures that identification and quantitation of analytes will be accurate for all samples. Review of the documentation provided for appropriate calibration determines whether or not the analytical results reported by the laboratory are valid and supported by the data.

The data deliverables for this project were included in multiple data packages in several shipments. Instrument calibration documentation was provided in a separate data package in association with the site sample data packages in this shipment and included camera and screen magnification calibration (performed 4/7/05 to 4/13/05), camera length and constant calibration (performed 4/5/05 to 4/14/05), EDS peak resolution check (performed on 4/7/05), and maintenance logs for both instruments used for analyses, covering the months of March and April of 2005. Previous data packages received for this project included instrument calibration for the months of 10/04 through 12/04. The analyses of the three samples in this data set were performed on 2/7/2005 and 2/8/2005; documentation of these parameter checks was not included for the month of 2/05.

A form entitled "Microscope Based Quality Control" for the month of April 2005 was included. This form listed the various instrument calibration parameters, required frequencies, dates performed, and results. According to this form, k-factor calibration was performed most recently on the two microscopes on 1/11/05 and 3/14/05; beam dose was calibrated on 2/9/05 and 3/18/05.

No documentation of grid opening size was provided.

Documentation to support the identification and quantitation in the site samples in these data packages was provided separately with a previous shipment of data packages from the same project, and included the following:

A letter representing documentation of an NVLAP laboratory site assessment conducted on 11/7/03 was included in the data package. The letter, dated 5/10/04, indicated that the laboratory met the on-site assessment requirements.

Results and evaluator notes and tables were included for an NISTIR 5351 analysis of an inter-laboratory QC sample. The laboratory's raw data were compiled and assessed by Batta Labs. Analysts were identified by initials and included one of the two analysts' initials documented with this sample set. "DW" and "KM" performed these PE sample analyses, "JH was not represented. According to the assessor's notes, the sample included chrysotile fibers and structures and the laboratory's results were within NVLAP and NISTIR 5351 acceptance limits. No raw data were provided for this QC sample in the original data package. Raw data were provided under separate cover, at the request of the validator.

Results for a New York State Department of Health Environmental Laboratory Approval Program proficiency test, conducted between 9/7/04 and 11/9/04, were also included. The proficiency samples included asbestos in air. The laboratory's results were satisfactory for all four of the air sample categories. Actinolite and amosite fiber types

were identified and counts were acceptable, according to the data sheet. No raw data were provided for this proficiency sample. Upon request, the laboratory provided raw data documenting the identification of actinolite and amosite asbestos on 1/27/05, in conjunction with the validation of a previous shipment of data packages. These data were inserted by the validator into the QC data package provided, as supporting data, with the previous shipment of data packages.

Documentation for a round-robin sample analyzed in the fall of 2004, by three separate laboratories, as part of the NVLAP requirements, was also included in the QC data package. The documentation included raw count sheets and reported results, as well as comparison with other laboratories' results. Results for all parameters were acceptable. According to the documentation, the only analyst who participated in these analyses was "DW."

Based on the fact that the laboratory demonstrated proficiency in the performance evaluation (PE) analyses performed in the third quarter of 2004, and that these PE samples included the two predominant asbestos types detected in this field sample set, no action was taken by the validator.

III. Blanks

Sample matrices known to be devoid of the analytes of interest (method blanks) are prepared and analyzed with each analytical batch. Evaluation of this parameter ensures that contamination introduced during preparation and analyses is not attributed to the field samples.

Other blanks may be generated in the field or laboratory to ensure that no contamination is introduced during sampling and/or storage.

No field-generated blanks were included with this data set.

The laboratory preparation list and log indicated that one laboratory preparation filter blank was prepared and analyzed by the indirect method in association with the entire 70-sample set (041172, 041188, 041191, 141210, and 050680). No raw data were supplied for this blank, but a value of "0" structures detected was present on the QC summary form. According to the prep sheets, this blank was prepared on 1/13/05 (ashed and "hydrolyzed") and 3/16/05 (grid preparation), while the field samples were prepared on 1/7/05 and 1/21/05. This blank would be an indicator of any contamination present in the blank filters used for preparation and for any contamination present in the prep lab environment on 1/13/05 and 3/16/05, but it does not address contamination issues for the dates on which the samples in this data set (041172) were prepared.

The indirect method used (ISO 13794), recommends analyzing a filter blank and a beaker blank with each set of samples prepared. In addition, it is recommended that the laboratory include an unused filter for preparation with every microscope slide containing sample filters that is prepared. None of these blanks were documented with this data set. Without blanks it is not possible to assess the presence or absence of laboratory contamination or its impact on the site sample results.

The laboratory had prepared blanks with the preparation and analyses of samples in this data set. At the client's request the laboratory analyzed a percentage of the prepared blanks. Data for these blanks were received by the validator on July 6, 2005. Four filter blanks, five field trip blanks, four glass filter blanks, and one column blank were prepared and analyzed as laboratory blanks. No asbestos structures were detected in any of the blanks.

IV. Spiked Samples

The analytes of interest are added in known concentrations to like-matrix blanks or authentic field samples before preparation. This parameter is evaluated in order to assess the laboratory's ability to preserve and recover the compounds of interest.

The analytical method does not require laboratory spiked sample analyses. It is recommended by the validator that some type of laboratory prepared or purchased spiked analyses be performed with each analytical sample batch.

The project requirements specified that results from the most recent inter-laboratory study would be acceptable as a laboratory control sample (LCS) for these data. This requirement was met by the laboratory and results, reported with previous data submissions for this project, for the inter-laboratory study sample were acceptable for all air sample parameters (see Section I). The data user should note, however, that no reference material was prepared and analyzed by the indirect method (ISO 13794) employed for the preparation and analyses of the site samples. This method is used when filter loading is too high to allow the use of the direct method (ISO 10312) and depends on recovery of material from the air-sampling filter, resuspension in solution, effecting a dilution, and redistribution onto a secondary filter which is then prepared as for the direct TEM analysis method. Because there are additional steps involved in the preparation, there are additional error factors introduced. It is recommended that a reference material be prepared and analyzed by the indirect method so that performance can be tracked by the laboratory for support of field sample analyses by this procedure.

V.   Duplicate/Replicate Samples

Results for duplicate/replicate samples are evaluated to assess the laboratory's precision for the analytes of interest in the applicable sample matrix. For asbestos analyses, duplicate and replicate measurements take the form of a combination of variables which include the preparation of the grid, the choice of grid openings to be analyzed, and the analyst performing the counting and identification of structures. For the indirect method the variables should also include preparation of the filter itself.

The laboratory included all of the QC samples from all of the field sample sets in this shipment in a separate data package under a separate report number (050580).

One of the two analysts, JH, not represented in the PE sample analyses included with the data packages for this project did perform intra-laboratory replicate and duplicate analyses on associated field samples. Results for these QC analyses for this analyst were within the sample-specific acceptance limits stipulated by the method.

The quality assurance project plan (QAPP) requires five types of laboratory duplicate/replicate analyses, each to be performed at a rate of 5% (one for every twenty) of the field samples. Based on the total of samples prepared by the indirect method and included in all of the data packages in this shipment combined (70 samples), four or more of each of these QC sample pairs were required (a total of 20 QC sample pairs).

The laboratory compared the primary asbestos structure count for each of the QC samples prepared and analyzed. Results for all of the duplicate/replicate pair types were evaluated based on 95% confidence limits determined from the original sample count result. Results for all of the reported QC samples were within the laboratory's calculated limits.

None of the samples in this data set (041172) was prepared as a replicate or duplicate pair. The laboratory analyzed a total of 11 QC sample pairs from the other three associated data sets. A summary of the laboratory QC samples analyzed is as follows:

Replicate analyses:

- . Two samples were analyzed as replicates, wherein a different preparation was analyzed by the same analyst;

Duplicate analyses:

- Three samples were analyzed as duplicates, wherein the same grid openings were recounted by a different analyst;

- Three samples were analyzed as duplicates, wherein different grid openings were selected for counting by a different analyst;

- Three samples were analyzed as duplicates, wherein a different analyst counted a different preparation.

No samples were analyzed as replicates, wherein the same analyst re-counts the same sample a second time counting different grid openings.

According to the preparation list and log, two samples (from 041188 and 041191) were re-prepared on 3/29/05 and 3/30/05. The second preparation of these two samples involved ashing the filters for two hours, according to notes on the prep list. It was assumed by the validator that these were the only samples which were carried through all of the filtering and grid preparation steps. Other QC samples listed as repreps were assumed to be additional grid preparations from the same filter only.

Agreement between the results for the 11 sample QC pairs analyzed in conjunction with the combined project-related laboratory batches in four of the required categories were acceptable. In addition, four samples were re-analyzed by the same analyst counting the same grid openings. These results were also acceptable according to the laboratory-specified limits. This category was not included as a requirement in the project QAPP.

The data user is cautioned that although the laboratory QC counts met the specified criteria, the acceptance range includes as much as a three-fold difference in asbestos concentrations for these samples. This range of variability is applicable to all asbestos results in this data set.

According to the QAPP provided with the data packages, field duplicates were required at a rate of 10% of field samples. Field duplicate pairs were not identified or evaluated as part of this validation effort.

VI. Identification

Identification of asbestos structures and fibers is dependent on sample preparation techniques, analyst training, instrument operation, and data interpretation. Comparison with results from known standards is used to evaluate the accuracy of the structure identification for field samples.

Actinolite, chrysotile, and tremolite were identified in the field and QC samples. According to the report forms provided in the QC package included with a previous data package shipment for the project, the laboratory correctly identified actinolite, chrysotile, and amosite in PE sample analyses performed in the third quarter of 2004. Comparison of identification between the various analysts, grid opening, and preparations combinations that make up the daily QC for these analyses, included separately with this shipment of data packages, were within acceptance limits. Therefore; based on the documentation provided, fiber and structure identifications for chrysotile, and tremolite/actinolite were determined to be valid as reported.

VII. · Quantitation and Reported Detection Limits

Raw data documentation is reviewed to ensure that all reported results and detection limits are correctly calculated, accurately reported, and supported by the raw data.

Results for asbestos categories, fiber density, and detection limits were correctly calculated and accurately reported by the laboratory, with one exception. Results were verified by the validator using the information included on the reporting forms and the chain of custody records.

The aspect ratio for the bundle identified and verified as chrysotile at grid location E123 in APG-L2-1CH-100404 was recorded as 2.0 by the analyst on the count sheet. This is below the 3:1 aspect ratio required for AHERA structures. This bundle should not be included in the count for AHERA categories. Results for total AHERA structures, AHERA structures >5, and AHERA structures 5-10 were corrected by the validator on the report form, data summary form (Table 1A) and in the electronic deliverables.

VIII. System Performance

This parameter is evaluated to ensure that the laboratory analytical systems were functioning properly at the time of analyses and that methodology appropriate to the analyses were followed.

The analytical systems appear to have been working satisfactorily and to have been calibrated properly at the time of these analyses, based on the documentation provided in this data package shipment. Grid opening calibration and spot size calibration were not documented

IX. Documentation

Data and documentation completeness is critical in providing support for the reported results. Problems encountered with the nature or quality of the data package documentation are addressed.

No raw data were provided in the data package for the proficiency samples analyzed in support of the laboratory's accreditation. Raw data to support the identification of actinolite and amosite were received upon request on 1/26/05 in conjunction with validation of a previous shipment of data from the same project.

Raw data for chrysotile fibers identified in only selected field samples from this data set were provided.

Count sheets included in the data package are computer generated forms. No date of the actual count is presented on these forms. If there is a corresponding bench sheet from which these forms are prepared, these should be supplied as a part of the data package. It is recommended that analyst's intials and date of count be added to the documentation.

The legend for the count sheets, which defines the codes used for the structure counts lists PSCH as the code for protocol chrysotile structures. The code appearing on the count sheets for this category is PCAS.

COMMENTS:

A.   The aspect ratio for the bundle identified and verified as chrysotile at grid location E123 in APG-L2-1CH-100404 was recorded as 2.0 by the analyst on the count sheet. This is below the 3:1 aspect ratio required for AHERA structures. This bundle should not be included in the count for AHERA categories. Results for total AHERA structures, AHERA structures >5, and AHERA structures 5-10 were corrected by the validator on the report form, data summary form (Table 1A) and in the electronic deliverables.

B. According to the laboratory report form (Form I) and the count sheet the number of grid openings counted for sample CC1-L6-3CB-100204 is 56. Concentrations, analytical sensitivity, and detection limit calculations performed by the laboratory were consistent with 56 grid openings. The value listed on the sample preparation log is 88. This value was corrected by the validator to match the number reported on the report form.

ADDITIONAL COMMENTS:

The laboratory reported results, analytical sensitivity, and detection limits to three significant figures. The data user should be aware that because all of these values are based on the counting of whole asbestos structures, the appropriate number of significant figures will be limited by the structure count. A total count of eight fibers will warrant results with only one significant figure; a count of 12 will warrant two, etc. Because the analytical sensitivity and detection limit are calculated from an assumed single asbestos structure, only one significant figure is accurate for these values, rather than the three reported by the laboratory. A second significant figure, if used, is considered estimated. The validator-calculated results, analytical sensitivities, and detection limits varied from the laboratory values in many cases, however, these discrepancies appeared to be due to rounding. The validator did not adjust the laboratory results to reduce the number of significant figures.

It is recommended that complete instrument calibration documentation be provided with every data package to fully support the site sample results.

The data results tables included as Table 1A include only the primary and total asbestos structure counts. Counts for individual categories required by the project Scope of Work are presented in the associated electronic data deliverables (EDD) tables.

This report was prepared according to the specifications of the analytical method, ISO Method 13794 " Ambient air - Determination of asbestos fibres - Indirect-transfer transmission electron microscopy method," the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," 10/99, and Trillium, Inc.'s SOP No. 0497-06A, for Validation of Analytical Data: Inorganic Analytes.

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document, "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," 2/94.

U   The analyte was analyzed for, but was not detected above the level of the reported value. The reported value is either the sample quantitation limit or the sample detection limit.

L   Indicates results which fall between the sample detection limit and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J   The associated value is an estimated quantity. The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R   The data are unusable. The analyte was analyzed for, but the presence or absence of the analyte cannot be verified.

UJ A combination of the "U" and "J" qualifier. The analyte was analyzed for but was not detected. The reported value is an estimate and may be inaccurate or imprecise.

041172R07TEM

Data Validation Report

TDD No: 09-04-01-0011
PAN: 001275.0440.01TA
Site: El Dorado Hills
Laboratory: Lab/Cor, Inc.
Reviewer: Denise A. Shepperd, Trillium, Inc.
Date: May 19, 2005
            Revised August 11, 2005

I.   Case Summary

SAMPLE INFORMATION:

Asbestos Samples:	AAMS-D09-100504; AAMS-D10-100604; and AAMS-D16-101204
Matrix:	3 Air samples
Analysis:	Asbestos by Transmission Electron Microscopy
Collection Dates:	October 5 through 12, 2004
Sample Receipt Date:	October 14, 2004
Filter Preparation Date:	January 21, 2005 and March 22, 2005
Grid Preparation Date:	March 22, 2005
TEM Analysis Dates:	March 29 and 31, 2005
Analytical Method:	ISO Method 13794

FIELD QC:

Field Trip Blanks (ZB):	NFB-L2-1ZB-10050; SFBB-L2-1ZB-10060; NYB-L2-1ZB-10070; JEG-L2-1ZB-10070; SRA-1ZB-1008004
Filter Blanks (FB):	SFBA-L2-FB-10050; JEG-L2-FB-101004; NRA-FB-101004
Column Balnk (FB):	NRA-FB-101005
Equipment Blanks (EB):	
Method Blank (MB):	4 glass filter blanks
Field Duplicates (D1):	Not Identified

TABLES:
  1A: Analytical Results with Qualifications
  1B: Data Qualifier Definitions for Inorganic Data Review

SAMPLING ISSUES:

No chain of custody documents were provided in the data package. Chain of custody documentation that included these samples was provided on 5/4/05 by electronic transfer, at the request of the validator.

VALIDATION PARAMETERS AND COMMENTS:

I.   Holding Times, Preservation and Sample Integrity

This parameter is evaluated to ensure that sample custody is documented from collection through analysis, samples are analyzed within the recommended holding time, and that no alteration in sample content has occurred during sample shipment, handling, and storage.

There is no established holding time or storage condition for asbestos samples.

II.   Calibration

The analyses of materials of known content ensures that identification and quantitation of analytes will be accurate for all samples. Review of the documentation provided for appropriate calibration determines whether or not the analytical results reported by the laboratory are valid and supported by the data.

The data deliverables for this project were included in multiple data packages in several shipments. Instrument calibration documentation was provided in a separate data package in association with the site sample data packages in this shipment and included camera and screen magnification calibration (performed 4/7/05 to 4/13/05), camera length and constant calibration (performed 4/5/05 to 4/14/05), EDS peak resolution check (performed on 4/7/05), and maintenance logs for both instruments used for analyses, covering the months of March and April of 2005.

A form entitled "Microscope Based Quality Control" for the month of April 2005 was included. This form listed the various instrument calibration parameters, required frequencies, dates performed, and results. According to this form, k-factor calibration was performed most recently on the two microscopes on 1/11/05 and 3/14/05; beam dose was calibrated on 2/9/05 and 3/18/05.

No documentation of grid opening size was provided.

Documentation to support the identification and quantitation in the site samples in these data packages was provided separately with a previous shipment of data packages from the same project, and included the following:

A letter representing documentation of an NVLAP laboratory site assessment conducted on 11/7/03 was included in the data package. The letter, dated 5/10/04, indicated that the laboratory met the on-site assessment requirements.

Results and evaluator notes and tables were included for an NISTIR 5351 analysis of an inter-laboratory QC sample. The laboratory's raw data were compiled and assessed by Batta Labs. Analysts were identified by initials and included one of the two analysts' initials documented with this sample set. "DW" and "KM" performed these PE sample analyses, "JH was not represented. According to the assessor's notes, the sample included chrysotile fibers and structures and the laboratory's results were within NVLAP and NISTIR 5351 acceptance limits. No raw data were provided for this QC sample in the original data package. Raw data were provided under separate cover, at the request of the validator.

Results for a New York State Department of Health Environmental Laboratory Approval Program proficiency test, conducted between 9/7/04 and 11/9/04, were also included. The proficiency samples included asbestos in air. The laboratory's results were satisfactory for all four of the air sample categories. Actinolite and amosite fiber types were identified and counts were acceptable, according to the data sheet. No raw data were provided for this proficiency sample. Upon request, the laboratory provided raw data documenting the identification of actinolite

and amosite asbestos on 1/27/05, in conjunction with the validation of a previous shipment of data packages. These data were inserted by the validator into the QC data package provided, as supporting data, with the previous shipment of data packages.

Documentation for a round-robin sample analyzed in the fall of 2004, by three separate laboratories, as part of the NVLAP requirements, was also included in the QC data package. The documentation included raw count sheets and reported results, as well as comparison with other laboratories' results. Results for all parameters were acceptable. According to the documentation, the only analyst who participated in these analyses was "DW."

Based on the fact that the laboratory demonstrated proficiency in the performance evaluation (PE) analyses performed in the third quarter of 2004, and that these PE samples included the two predominant asbestos types detected in this field sample set, no action was taken by the validator.

III. Blanks

Sample matrices known to be devoid of the analytes of interest (method blanks) are prepared and analyzed with each analytical batch. Evaluation of this parameter ensures that contamination introduced during preparation and analyses is not attributed to the field samples.

Other blanks may be generated in the field or laboratory to ensure that no contamination is introduced during sampling and/or storage.

No field-generated blanks were included with this data set.

The laboratory preparation list and log indicated that one laboratory preparation filter blank was prepared and analyzed by the indirect method in association with the entire 70-sample set (041172, 041188, 041191, 141210, and 050680). No raw data were supplied for this blank, but a value of "0" structures detected was present on the QC summary form. According to the prep sheets, this blank was prepared on 1/13/05 (ashed and "hydrolyzed") and 3/16/05 (grid preparation). This blank would be an indicator of any contamination present in the blank filters used for preparation and for any contamination present in the prep lab environment on 1/13/05 and 3/16/05, but it does not address contamination issues for the dates on which the samples in this data set (041210) were prepared.

The indirect method used (ISO 13794), recommends analyzing a filter blank and a beaker blank with each set of samples prepared. In addition, it is recommended that the laboratory include an unused filter for preparation with every microscope slide containing sample filters that is prepared. None of these blanks were documented with this data set. Without blanks it is not possible to assess the presence or absence of laboratory contamination or its impact on the site sample results.

The laboratory had prepared blanks with the preparation and analyses of samples in this data set. At the client's request the laboratory analyzed a percentage of the prepared blanks. Data for these blanks were received by the validator on July 6, 2005. Four filter blanks, five field trip blanks, four glass filter blanks, and one column blank were prepared and analyzed as laboratory blanks. No asbestos structures were detected in any of the blanks.

IV. Spiked Samples

The analytes of interest are added in known concentrations to like-matrix blanks or authentic field samples before preparation. This parameter is evaluated in order to assess the laboratory's ability to preserve and recover the compounds of interest.

The analytical method does not require laboratory spiked sample analyses. It is recommended by the validator that some type of laboratory prepared or purchased spiked analyses be performed with each analytical sample batch.

The project requirements specified that results from the most recent inter-laboratory study would be acceptable as a laboratory control sample (LCS) for these data. This requirement was met by the laboratory and results, reported with previous data submissions for this project, for the inter-laboratory study sample were acceptable for all air sample parameters (see Section I). The data user should note, however, that no reference material was prepared and analyzed by the indirect method (ISO 13794) employed for the preparation and analyses of the site samples. This method is used when filter loading is too high to allow the use of the direct method (ISO 10312) and depends on recovery of material from the air-sampling filter, resuspension in solution, effecting a dilution, and redistribution on a secondary filter which is then prepared as for the direct TEM analysis method. Because there are additional steps involved in the preparation, there are additional error factors introduced. It is recommended that a reference material be prepared and analyzed by the indirect method so that performance can be tracked by the laboratory for support of field sample analyses by this procedure.

V. Duplicate/Replicate Samples

Results for duplicate/replicate samples are evaluated to assess the laboratory's precision for the analytes of interest in the applicable sample matrix. For asbestos analyses, duplicate and replicate measurements take the form of a combination of variables which include the preparation of the grid, the choice of grid openings to be analyzed, and the analyst performing the counting and identification of structures. For the indirect method the variables should also include preparation of the filter itself.

The laboratory included all of the QC samples from all of the field sample sets in this shipment in a separate data package under a separate report number (050580).

One of the two analysts, JH, not represented in the PE sample analyses included with the data packages for this project did perform intra-laboratory replicate and duplicate analyses on associated field samples. Results for these QC analyses for this analyst were within the sample-specific acceptance limits stipulated by the method.

The quality assurance project plan (QAPP) requires five types of laboratory duplicate/replicate analyses, each to be performed at a rate of 5% (one for every twenty) of the field samples. Based on the total of samples prepared by the indirect method and included in all of the data packages in this shipment combined (70 samples), four or more of each of these QC sample pairs were required (a total of 20 QC sample pairs).

The laboratory compared the primary asbestos structure count for each of the QC samples prepared and analyzed. Results for all of the duplicate/replicate pair types were evaluated based on 95% confidence limits determined from the original sample count result. Results for all of the reported QC samples were within the laboratory's calculated limits.

One of the samples (AAMS-D09-100504) in this data set (041210) was prepared as a replicate pair, wherein the same analyst counted a different grid preparation of the same sample. Results for these paired samples showed acceptable agreement (34 and 26; QC range 23.55 to 47.51)

The laboratory analyzed a total of 11 QC sample pairs from three of the associated data sets. A summary of the laboratory QC samples analyzed is as follows:.

Replicate analyses:

- Two samples were analyzed as replicates, wherein a different preparation was analyzed by the same analyst;

Duplicate analyses:

- Three samples were analyzed as duplicates, wherein the same grid openings were recounted by a different analyst;

- Three samples were analyzed as duplicates, wherein different grid openings were selected for counting by a different analyst;

- Three samples were analyzed as duplicates, wherein a different analyst counted a different preparation.

No samples were analyzed as replicates, wherein the same analyst re-counts the same sample a second time counting different grid openings.

According to the preparation list and log, two samples (from 041188 and 041191) were re-prepared on 3/29/05 and 3/30/05. The second preparation of these two samples involved ashing the filters for two hours, according to notes on the prep list. It was assumed by the validator that these were the only samples which were carried through all of the filtering and grid preparation steps. Other QC samples listed as repreps were assumed to be additional grid preparations from the same filter only.

Agreement between the results for the 11 sample QC pairs analyzed in conjunction with the combined project-related laboratory batches in four of the required categories were acceptable. In addition, four samples were re-analyzed by the same analyst counting the same grid openings. These results were also acceptable according to the laboratory-specified limits. This category was not included as a requirement in the project QAPP.

The data user is cautioned that although the laboratory QC counts met the specified criteria, the acceptance range includes as much as a three-fold difference in asbestos concentrations for these samples. This range of variability is applicable to all asbestos results in this data set.

According to the QAPP provided with the data packages, field duplicates were required at a rate of 10% of field samples. Field duplicate pairs were not identified or evaluated as part of this validation effort.

VI. Identification

Identification of asbestos structures and fibers is dependent on sample preparation techniques, analyst training, instrument operation, and data interpretation. Comparison with results from known standards is used to evaluate the accuracy of the structure identification for field samples.

Actinolite, chrysotile, and tremolite were identified in the field and QC samples. According to the report forms provided in the QC package included with a previous data package shipment for the project, the laboratory correctly identified actinolite, chrysotile, and amosite in PE sample analyses performed in the third quarter of 2004. Comparison of identification between the various analysts, grid opening, and preparations combinations that make up the daily QC for these analyses, included separately with this shipment of data packages, were within acceptance limits. Therefore, based on the documentation provided, fiber and structure identifications for chrysotile, and tremolite/actinolite were determined to be valid as reported.

VII. Quantitation and Reported Detection Limits

Raw data documentation is reviewed to ensure that all reported results and detection limits are correctly calculated, accurately reported, and supported by the raw data.

Results for asbestos categories, fiber density, and detection limits were correctly calculated and accurately reported by the laboratory, with one exception. Results were verified by the validator using the information included on the reporting forms and the chain of custody records.

The number of grid openings counted, as reported on the Form I and prep list for sample AAMS-D10-100604 was 50. According to the count sheet for this sample, 52 grid openings were actually counted for this sample. Results for all fiber categories, the analytical sensitivity, and the detection limit were corrected by the validator for this sample on the data summary form, Form I, and electronic data deliverable (EDD).

VIII. System Performance

This parameter is evaluated to ensure that the laboratory analytical systems were functioning properly at the time of analyses and that methodology appropriate to the analyses were followed.

The analytical systems appear to have been working satisfactorily and to have been calibrated properly at the time of these analyses, based on the documentation provided in this data package shipment. Grid opening calibration and spot size calibration were not documented

IX. Documentation

Data and documentation completeness is critical in providing support for the reported results. Problems encountered with the nature or quality of the data package documentation are addressed.

No raw data were provided in the data package for the proficiency samples analyzed in support of the laboratory's accreditation. Raw data to support the identification of actinolite and amosite were received upon request on 1/26/05 in conjunction with validation of a previous shipment of data from the same project.

Raw data for chrysotile fibers identified in only selected field samples from this data set were provided. A listing of fiber verifications was provided and included at least one structure from each of the samples in which chrysotile was identified.

Count sheets included in the data package are computer generated forms. No date of the actual count is presented on these forms. If there is a corresponding bench sheet from which these forms are prepared, these should be supplied as a part of the data package. It is recommended that analyst's intials and date of count be added to the documentation.

The legend for the count sheets, which defines the codes used for the structure counts lists PSCH as the code for protocol chrysotile structures. The code appearing on the count sheets for this category is PCAS.

COMMENTS:

A. The number of grid openings counted as reported on the Form I and prep list for sample AAMS-D10-100604 was 50. According to the raw data count sheet for this included in the data package, 52 grid openings were actually counted for this sample. Results for all fiber categories, the analytical sensitivity, and the detection limit were corrected by the validator for this sample on the data summary form, analysis detail (Form I), and electronic data deliverable (EDD).

ADDITIONAL COMMENTS:

The laboratory reported results, analytical sensitivity, and detection limits to three significant figures. The data user should be aware that because all of these values are based on the counting of whole asbestos structures, the

appropriate number of significant figures will be limited by the structure count. A total count of eight fibers will warrant results with only one significant figure; a count of 12 will warrant two, etc. Because the analytical sensitivity and detection limit are calculated from an assumed single asbestos structure, only one significant figure is accurate for these values, rather than the three reported by the laboratory. A second significant figure, if used, is considered estimated. The validator-calculated results, analytical sensitivities, and detection limits varied from the laboratory values in many cases, however, these discrepancies appeared to be due to rounding. The validator did not adjust the laboratory results to reduce the number of significant figures.

It is recommended that complete instrument calibration documentation be provided with every data package to fully support the site sample results.

The data results tables included as Table 1A include only the primary and total asbestos structure counts. Counts for individual categories required by the project Scope of Work are presented in the associated electronic data deliverables (EDD) tables.

This report was prepared according to the specifications of the analytical method, ISO Method 13794 " Ambient air - Determination of asbestos fibres - Indirect-transfer transmission electron microscopy method," the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," 10/99, and Trillium, Inc.'s SOP No. 0497-06A, for Validation of Analytical Data: Inorganic Analytes.

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document, "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," 2/94.

U   The analyte was analyzed for, but was not detected above the level of the reported value. The reported value is either the sample quantitation limit or the sample detection limit.

L   Indicates results which fall between the sample detection limit and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J   The associated value is an estimated quantity. The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R   The data are unusable. The analyte was analyzed for, but the presence <u>or</u> absence of the analyte cannot be verified.

UJ   A combination of the "U" and "J" qualifier. The analyte was analyzed for but was not detected. The reported value is an estimate and may be inaccurate or imprecise.

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